

# Is Competitive Entry Free? Bypass and Partial Deregulation in Natural Gas Markets

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Partial deregulation has occurred in a broad range of industries, from telecommunications to transportation to financial services.<sup>1</sup> This first phase of deregulation has given impetus to an intensive debate over future regulatory policy. Some commentators advocate further partial deregulation of industries such as natural gas and electric power<sup>2</sup> while others push for re-regulation of airlines and railroads.<sup>3</sup> The immediate question is whether the deregulation that has taken place will achieve the benefits of market competition or will create instead imperfect markets that are neither fish nor fowl, markets that are less efficient than if they were either fully regulated or fully competitive. The question arises from the inherent nature of partial deregulation, which often maintains price controls and other restrictions on incumbent firms while removing entry barriers. This disparity may cause

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1. See generally REGULATORY REFORM: WHAT ACTUALLY HAPPENED 1-13 (L. Weiss & M. Klass eds. 1986).

2. For a discussion focusing on natural gas, see Broadman & Kalt, *How Natural is Monopoly? The Case of Bypass in Natural Gas Distribution Markets*, 6 YALE J. ON REG. 181 (1989); Carpenter, Jacoby & Wright, *Adapting to Change in Natural Gas Markets*, in ENERGY: MARKETS AND REGULATION, ESSAYS IN HONOR OF M.A. ADELMAN 1, 25-27 (R. Gordon ed. 1987). For a discussion focusing on electricity power regulation, see P. JOSKOW & R. SCHMALENSEE, MARKETS FOR POWER: AN ANALYSIS OF ELECTRIC UTILITY DEREGULATION 3-90 (1983); Smith, *Electric Power Deregulation: Background and Prospects*, 6 CONTEMP. POL'Y ISSUES 14 (1988).

3. For example, electric utilities have lobbied for rate regulation of some railroads by the I.C.C. See M. REAGAN, REGULATION: THE POLITICS OF POLICY 83 (1987). For an interesting view of the regulatory debate in the airline industry, see *Airline Deregulation: Hearings Before the Subcommittee on Antitrust, Monopolies and Business Rights of the Senate Comm. on the Judiciary*, 100th Cong., 1st Sess. (1988). See also Waldman, *Regulation Comes Back*, NEWSWEEK, Sept. 12, 1988, at 44.

entrants to "bypass" established regulated facilities. The results may be costly duplication of capital facilities, higher prices for consumers, and paradoxically, an increase in regulation as policy-makers seek to "manage" the resulting competition.

Markets that are partially deregulated in this way do not present firms with an equal opportunity to compete. New entrants to those markets must make irreversible investments in capacity while incumbent firms already have sunk these costs. However, incumbent firms face such restrictions as rate regulations, common carrier obligations, and other limits on their contractual commitments. Furthermore, regulation of access to the established firm's facilities may operate to subsidize entrants. Efforts by various regulatory authorities to establish a "level playing field" may create what we call "incumbent burdens."<sup>4</sup> These are regulatory constraints that limit an established firm's ability to compete. Under partial deregulation, then, incumbents cannot compete freely with entrants.

The social costs of "free" entry with price controls may be very high. Entrants' investment in large-scale production and transmission operations can result in costly duplication of facilities. Competition with entrants may alter regulated rate structures and create significant welfare losses for captive customers of regulated firms. Thus, while competitive entry can create benefits for some customers seeking to bypass established facilities, it is by no means a costless experiment.

This Article focuses on an assessment of potential costs in natural gas transmission, although its conclusions apply to partial deregulation of other industries, particularly electric power generation and transmission. Part I of this Article examines bypass and the role of sunk costs. Part II discusses competition and bypass of established facilities. The benefits and costs of bypass are noted in Part III and examined using a case study in Part IV. This Article concludes with recommendations for a coherent policy toward bypass.

4. See *infra* Part II.B.

## I. Bypass and Sunk Costs

The term "bypass" denotes entry of an alternate supply source in a partially deregulated market.<sup>5</sup> Introducing new capacity may lower the residual demand that incumbent firms face. Since the entrant must make irreversible investments in capacity and the incumbent firms generally possess large-scale transmission and production facilities, this decreased demand can create substantial excess capacity. The extent of excess capacity depends on the investment decisions of entering firms, the existing capital stock, the growth rate of market demand, and the competitive interaction between entrants and incumbents.

Customers and entering firms can bypass the facilities of incumbent firms in a variety of ways. In natural gas transmission and distribution, this can result in duplicate pipeline capacity. The rapidly evolving market for natural gas has seen a shift in the role of pipelines away from wholesaling toward unbundled transportation. An assessment of bypass is required in the newly deregulated natural gas industry.

### A. Capacity, Demand, and Sunk Costs

The size of the existing capital stock in markets facing partial deregulation reflects decisions made under former regulatory policies. Capacity choices in regulated markets result from negotiations between the regulatory authority, the regulated utility, and customer representatives.<sup>6</sup> The investment choices of regulated firms are subject to regulatory approval through prudency reviews.<sup>7</sup> Thus, rate regulation may affect investment decisions in a number of ways. The well-known Averch-Johnson analysis raises the possibility that rate-of-return regulation may bias the relative share of capital investment upward as regulated

5. Bypass is now a common term of art in regulated, and recently deregulated, industries. Bypass in the natural gas industry is defined as the development of specialized facilities that circumvent those facilities owned and operated by the local distribution company (LDC).

6. For a discussion of rate regulation, bargaining, and the role of interest groups, see D. SPULBER, *REGULATION AND MARKETS* 267-349 (1989).

7. Commissions generally control investments deemed improper by disallowing them for ratemaking purposes. See, e.g., CAL. PUB. UTIL. CODE §§ 454.8, 463 (West 1975 & Supp. 1989).

firms seek to expand their rate base.<sup>8</sup> Fuel-use restrictions, environmental regulations, common carrier obligations, and service quality or reliability requirements can lead to increases in capital investment.<sup>9</sup>

The capacity decisions that regulated firms make also depend on regulatory contracts assuring the firm cost recovery plus a rate of return. These regulatory contracts reduce the risks associated with irreversible investment and therefore may increase investment<sup>10</sup> relative to what might have occurred in the absence of regulation.<sup>11</sup> In some cases, the decision to permit competitive entry while maintaining controls on the incumbent can be viewed as a form of regulatory opportunism since the incumbent may not be able to recover the cost of established facilities. If firms anticipate that rates will be negotiated downward after they construct facilities, their incentives to invest in the first place may be reduced.

Regulatory decisions in the energy sector (electricity and natural gas) have resulted in capacity levels that generally have

8. Averch & Johnson, *Behavior of the Firm Under Regulatory Constraint*, 52 AM. ECON. REV. 1052 (1962). Averch and Johnson show that under certain conditions a larger capital investment can increase profits when rates of return are constrained.

For a discussion of the technical conditions under which the Averch-Johnson effect applies, see E. BAILEY, *ECONOMIC THEORY OF REGULATORY CONSTRAINT* 125-37 (1973); Baumol & Klevorick, *Input Choices and Rate of Return Regulation: An Overview of the Discussion*, 1 BELL J. ECON. & MGMT. SCI. 162, 163-73 (1970). For a dynamic analysis and discussion of the empirical literature, see Spulber & Becker, *Regulatory Lag and Deregulation with Imperfectly Adjustable Capital*, 6 J. ECON. DYNAMICS & CONTROL 137 (1983).

9. Fuel-use restrictions require electric utilities to use a particular fuel such as low-sulfur fuel oil. Meeting these restrictions may entail additional capital investments. See Joskow, *Inflation and Environmental Concern: Structural Change in the Process of Public Utility Price Regulation*, 17 J.L. & ECON. 291, 314-16 (1974).

10. On the other hand, the regulatory process itself may reduce investment levels. The phenomenon of opportunism identified by Williamson may lead regulators to take advantage of the sunk costs of regulated firms by setting rates on the basis of operating expenses. Williamson defines opportunism as "self-interest seeking with guile." O. WILLIAMSON, *MARKETS AND HIERARCHIES: ANALYSIS AND ANTITRUST IMPLICATIONS* 26 (1975).

Opportunism also can lead to the problem of contractual "hold-up" in private contracts. See Klein, Crawford & Alchian, *Vertical Integration, Appropriable Rents, and the Competitive Contracting Process*, 21 J.L. & ECON. 297, 300 (1978).

11. Rate-of-return regulation, by regulating entry and by assuring investors of the opportunity to earn the permitted rate of return, reduces the risks associated with recovering the costs of large-scale, irreversible investment. For a discussion of regulation as an administered contract, see Goldberg, *Regulation and Administered Contracts*, 7 BELL J. ECON. 426, 441 (1976). The role of regulation as a means of reducing risks is widely recognized. See B. OWEN & R. BRAEUTIGAM, *THE REGULATION GAME: STRATEGIC USE OF THE ADMINISTRATIVE PROCESS* 239 (1978).

been viewed as adequate for projected near-term demand levels.<sup>12</sup> Thus, it is relevant to consider whether new entry will create excess capacity or whether such entry is desirable to meet future capacity requirements.

There is a fundamental asymmetry in the costs of adjusting capacity in the regulated transmission industries. Investments in capacity in transmission facilities are both irreversible and market specific.<sup>13</sup> The investment costs are said to be "sunk" since the capital cannot generally be sold or transferred to other markets. Capital equipment in the transmission industries differs from that used in airlines, trucking, or other transportation enterprises, where equipment is more easily relocated and adapted to other uses.<sup>14</sup> Furthermore, capital equipment such as electric transmission lines or natural gas pipelines differs from capital used in manufacturing products such as steel and automobiles. In manufacturing these products, the capital equipment often can be adapted to vary with the type of product made, and the products can be transported to a variety of markets far removed from the location of the factory. Capacity in the transmission industry cannot be reduced except through abandonment, divestiture, or depreciation.<sup>15</sup> On the other hand, capacity can be increased at the incremental cost of new construction.

Capacity adjustments must be based on long-term estimates of customer demand. As is well known from the literature on peak-load pricing, capacity requirements depend on the rate structure over time and across customer classes and must be tailored to meet peak demands.<sup>16</sup> Because capacity is fixed in the short-run, there will inevitably be both excess capacity and insufficient capacity relative to short-run demand fluctuations.<sup>17</sup> Steady increases in the demand for capacity can be met with growth in

12. See ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY, AN ANALYSIS OF FEDERAL ENERGY REGULATORY COMMISSION (FERC) ORDER 436 at 2 (1986) [hereinafter FERC ANALYSIS].

13. An example of an irreversible, market-specific investment is a pipeline network that carries natural gas from the field to the city gate of the local distribution company. The regulatory authority must approve any extension, alteration, and abandonment of capital once it has been constructed and dedicated to public service. See, e.g., 15 U.S.C. § 717f(b) (1982) (federal regulation of capital use).

14. P. JOSKOW & R. SCHMALENSEE, *supra* note 2, at 9.

15. See *supra* note 13.

16. See, e.g., Boiteux, *La Tarification des Demands en Pointe: Application de la Theorie de la Vente au Cout Marginal*, 58 REVUE GENERALE DE L'ELECTRICITE 321 (1949), translated as Boiteux, *Peak-Load Pricing*, 33 J. BUS. 157, 158 (1960).

17. For theoretical derivations, see Panzar, *A Neoclassical Approach to Peak Load Pricing*, 7 BELL J. ECON. 521, 529 (1976).

the production, storage, and transmission system. The possibility of decreases in long-run demand for capacity is a cause of great concern. Large, unanticipated reductions in demand combined with downward rigidity in capacity can lead to excess capacity. This excess capacity poses risks for regulated firms since cost recovery is permitted only for assets that are deemed used and useful.<sup>18</sup> In many instances, the earnings of regulated firms allow recovery of capacity costs only after twenty to thirty years of operation.<sup>19</sup> Reductions in demand can also raise rates for customers since cost recovery is spread over a smaller customer base.

Cost recovery considerations aside, it is, of course, inappropriate for a firm to base future investment decisions on the level of sunk costs. However, it is important to take into account existing capacity in evaluating whether *additional* future capacity investment is required. Particularly because investment in capacity is irreversible, firms must carefully evaluate the future need for increases in capacity to avoid making inefficient investments. Because bypass has the potential to affect capacity levels, its occurrence has significant implications for the regulatory agenda. The usefulness of the capacity investment that accompanies new entry must be an important consideration in evaluating the impact of proposed regulatory policies toward bypass.

### B. *Forms of Bypass*

Long-term reductions in demand for capacity can take many forms. The type of bypass that occurs as a consequence of deregulation may affect the allocation of costs and economic efficiency in regulated industries as well as future investment patterns. Customers can choose to bypass the entire production and transmission system of incumbent firms. Large industrial customers can relocate to other areas or can connect directly to a competing system.<sup>20</sup> In some cases, this change does not involve

18. Joskow & Schmalensee, *Incentive Regulation for Electric Utilities*, 4 YALE J. ON REG. 1, 4 (1986).

19. Under cost-of-service ratemaking, the regulated firm recovers its invested funds over the anticipated life of the capital asset. In the case of transmission facilities, expected service lives can exceed 20 years. See, e.g., Kern River Gas Transmission Company, Illustrative Twenty-Year Costs of Service (Exhibit No. KR-10C, FERC Docket Nos. CP85-437 et al.) (on file with authors).

20. See P. JOSKOW & R. SCHMALENSEE, *supra* note 2, at 22-23.

substantial investment in new capacity by the other system but is simply the export of excess capacity from one system to another. In other cases, connection to another transmission system can involve large-scale investment in new capacity.<sup>21</sup> Other ways of bypassing production and transmission include fuel-switching and conservation in response to tax incentives or regulatory restrictions.<sup>22</sup> For example, in electric power, under the Public Utility Regulatory Policies Act of 1978 (PURPA),<sup>23</sup> growth of co-generation<sup>24</sup> has taken place as a result of regulatory incentives and subsidies.<sup>25</sup> Bypass can involve particular stages in a vertically integrated production and transmission sequence.<sup>26</sup> Customers can bypass the production or wholesale services offered by incumbent firms by purchasing the regulated firm's transmission services exclusively.<sup>27</sup> Electric utility customers bypass the incumbent utility's power generation capacity by purchasing bulk wholesale power from independent generators or from other integrated utilities and contracting for its transmission on the regulated firm's lines.<sup>28</sup> This practice is known as "wheeling." Natural gas customers can purchase supplies directly from producers or other pipelines and obtain transmission services from the regulated incumbent.<sup>29</sup> This is known as "contract carriage."

21. An example is given in the natural gas case study in Part IV, *infra*.

22. For a discussion of the potential for interfuel substitution in the industrial sector, see P. MACAVOY, *ENERGY POLICY: AN ECONOMIC ANALYSIS* 163-89 (1983).

23. Pub. L. No. 95-617, 92 Stat. 3117 (codified as amended at 16 U.S.C. §§ 2601-2645 (1982)).

24. Cogeneration refers to the joint production of heat and electric power by industrial power users. See Joskow, *Industrial Cogeneration and Electricity Production in the United States*, in *REGULATORY REFORM AND PUBLIC UTILITIES* 63, 65 (M. Crew ed. 1982); Joskow & Jones, *The Simple Economics of Cogeneration*, 4 *ENERGY J.* 1, 2 (1986).

25. Joskow, *supra* note 24, at 87-96. Cogeneration reduces the demand for capacity in electricity generation, transmission, and distribution.

26. In some instances, municipalities have sought to acquire the local transmission network of electric utilities. See, e.g., Application of Pacific Gas and Electric Company and the City of Redding for an Order Authorizing the Former to Sell and Convey to the Latter Certain Electric Distribution Facilities (Cal. Pub. Utils. Comm'n Decision No. 85-11-018, Nov. 6, 1985) (on file with authors).

27. Regulation of Natural Gas Pipelines After Partial Wellhead Decontrol, FERC Order No. 436, 50 Fed. Reg. 42,408 (1985) (to be codified at 18 C.F.R. §§ 2, 157, 250, 284, 375, 381) [hereinafter FERC Order No. 436] encourages interstate pipelines to make capacity available on a nondiscriminatory basis for the private transportation of natural gas.

28. P. JOSKOW & R. SCHMALENSEE, *supra* note 2.

29. See *supra* note 27.

*C. Bypass in Natural Gas Transmission*

Potential bypass in the natural gas industry involves proposals by new entrants to build new gas pipelines to serve large industrial customers. The proposed projects involve billions of dollars in capital outlays for construction of transmission facilities.<sup>30</sup> These projects may duplicate existing capacity and raise costs for pipeline customers as they divert demand from local distribution companies (LDCs). To place this problem in context, it is necessary to review not only the changing role of pipeline firms in the natural gas industry in the 1980s, but also some of the regulatory developments that have caused this changed role.

Until the early 1980s, pipelines purchased natural gas from producers under long-term, fixed-price contracts.<sup>31</sup> The gas was then resold, also under long-term contracts, to LDCs and large industrial customers. Thus, the pipeline firms acted primarily as wholesalers, providing their customers with a combination of services including transportation, risk-sharing contracts, and negotiation with producers. As a result of a changing federal regulatory framework, the 1980s have witnessed a significant reduction in purchase contracts between pipelines and producers, and between pipelines and their customers, as sales have declined and as transportation services have grown.<sup>32</sup>

In the early 1980s, contract carriage represented a small share of total throughput of gas.<sup>33</sup> By the late 1980s, however, carriage rose from almost 7 quads to almost 10.9 quads, while total throughput declined from approximately 19 quads to 16.6 quads.<sup>34</sup> Table 1 details this shift. The share of throughput devoted to carriage rose from 36% to 66%, displacing sales, which fell by more than half. The increase in carriage was due to an

30. This will be evident from the case study presented in Part IV, *infra*, which analyzes proposals to build new interstate pipelines to serve the enhanced oil recovery (EOR) market in Kern County, California. For a general statement of the scope of current FERC proceedings regarding these proposals, see Mojave Pipeline Co., 35 Fed. Energy Reg. Comm'n Rep. (CCH) ¶ 61,199 (May 19, 1986) (Docket Nos. CP85-437 et al.) (order consolidating proceeding for comparative hearing).

31. See ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY, WELLHEAD PURCHASES BY INTERSTATE NATURAL GAS PIPELINE COMPANIES SINCE THE NGPA: TRENDS AND PROFILES 3-6 (1988) [hereinafter WELLHEAD PURCHASES].

32. U.S. DEP'T OF ENERGY, ENERGY SECURITY: A REPORT TO THE PRESIDENT OF THE UNITED STATES 123-24 (1987) [hereinafter ENERGY SECURITY].

33. "Throughput" is a pipeline's total sales and carriage.

34. A "quad" is one quadrillion BTU.



increase in carriage for distributors, end users, marketers, and brokers.<sup>35</sup>

Table 1<sup>36</sup>

Sales and Carriage by Interstate  
Natural Gas Pipelines

<u>Year</u>	<u>Throughput (Quads)</u>	<u>Sale Share of Throughput (%)</u>
1984	19.07	64
1985	17.26	61
1986	15.37	47
1987	16.63	34

This changing role of natural gas pipeline companies is due in large part to the partial deregulation of wellhead natural gas under the Natural Gas Policy Act of 1978 (the NGPA).<sup>37</sup> Market conditions prior to the enactment of the NGPA and the utility regulations placed on interstate pipelines have also played a major role.<sup>38</sup>

When Congress enacted the NGPA, a complex set of pre-existing contracts with suppliers already bound the pipelines.<sup>39</sup> Pipelines faced contractual obligations for resale that required them to make additional purchases of gas.<sup>40</sup> Rates were subject to utility regulations that allowed pass-throughs to pipeline customers of the average costs of purchased gas.<sup>41</sup> Furthermore, pipeline tariffs included both a demand charge and a commodity charge. These charges were regulated by state agencies for

35. See INTERSTATE NATURAL GAS ASS'N OF AM., CARRIAGE THROUGH 1987 2 (INGAA Issue Analysis). Carriage for other pipelines fell slightly over the period.

36. *Id.* at Appendix A, Table A-2.

37. Pub. L. No. 95-621, 92 Stat. 3352 (codified at 15 U.S.C. §§ 3301-3342 (1982)).

38. P. MACAVOY, THE REGULATED INDUSTRIES 105-11 (1979).

39. *Id.*

40. ENERGY SECURITY, *supra* note 32, at 123.

41. A. TUSSING & C. BARLOW, THE NATURAL GAS INDUSTRY: EVOLUTION, STRUCTURE AND ECONOMICS 60 (1984).

intrastate commerce<sup>42</sup> and by the Federal Energy Regulatory Commission (FERC) for interstate commerce.<sup>43</sup> The demand and commodity charges acted as a two-part tariff, with the demand charge serving as the fixed fee and the commodity charge as a per-unit price. Pipelines were able to pass on a portion of fixed and variable costs through the demand charge. This was referred to as the "minimum bill," since customer payments included both the demand charge and any additional commodity charges for purchased gas.<sup>44</sup>

Pipelines also held long-term contracts with natural gas producers.<sup>45</sup> These contracts had two interrelated provisions that created substantial difficulties in the wake of the NGPA. First, contracts between pipelines and producers contained "take-or-pay" provisions that required a minimum payment for gas whether or not the pipeline took deliveries.<sup>46</sup> Such contract terms provided for sharing of market risks between suppliers and pipelines, ensuring revenues to producers and gas supplies to the pipeline. Second, the contracts contained escalator or "most-favored nation" clauses that tied the contract price of gas to the price paid in the particular location of the natural gas field.<sup>47</sup> This type of clause was meant to ensure that contract prices for gas reflected market prices. The escalator clause effectively tied the minimum payments set by take-or-pay provisions to the market price of gas. Unfortunately, the escalator clause functions as a ratchet mechanism, increasing the pipeline's obligation to pay when market prices rise, but not permitting downward adjustments if market prices fall. While energy prices may be expected to follow a long-term upward trend given scarce supplies and limited discoveries of new

42. For a discussion of state commission rate authority over investor-owned utilities, see NAT'L ASS'N OF REGULATORY COMM'NS, 1987 ANNUAL REPORT ON UTILITY REGULATION 397-98 (1988).

43. The Natural Gas Act of 1938, ch. 556, 52 Stat. 821 (codified as amended at 15 U.S.C. §§ 717-717w (1982)) required regulation of interstate pipeline companies by the Federal Power Commission. In 1977, many of the powers of the Federal Power Commission were vested in the new Federal Department of Energy.

44. The Federal Power Commission introduced minimum bills in pipeline ratemaking in 1958. See ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY, A STUDY OF CONTRACTS BETWEEN INTERSTATE PIPELINES AND THEIR CUSTOMERS 21-23 (1984) [hereinafter STUDY OF CONTRACTS].

45. *Id.* at 27.

46. *Id.* at 26-28.

47. *Id.* at 34-35.

deposits,<sup>48</sup> large fluctuations may still occur, with long periods of constant or falling prices.<sup>49</sup>

It is in this market setting, within a network of existing contracts, that the NGPA took effect. Pipeline companies, anticipating future gas shortages and faced with contractual obligations for resale, sought to increase contractual purchases of gas.<sup>50</sup> The partial deregulation of wellhead prices under the NGPA created pricing categories for gas that differed on the basis of production methods, the presence or absence of prior interstate or intrastate contracts, and other factors. Generally speaking, the gas was classified as "old gas," "new gas," and "high-cost gas,"<sup>51</sup> although a large number of subcategories existed. The multiple price categories and the purchasing policies of many pipelines created severe distortions in wellhead prices. Because pipelines were able to recover the average cost of purchased gas, some pipelines bid up the cost of new and deregulated deep gas to levels substantially above market prices.<sup>52</sup> The high-cost supplies were then averaged or "rolled in" with their existing low-cost supplies. Due to take-or-pay provisions and most-favored nation clauses, many pipelines saw their contractual obligations soar as a result of the high bids for gas placed by other pipelines.<sup>53</sup> Consequently, those pipelines with smaller cushions of old gas faced relatively higher average gas purchase costs.

For a significant number of pipelines, the average cost of gas rose above the market price of gas, creating serious financial consequences.<sup>54</sup> In many instances, pipelines attempted to renegotiate contracts to reduce contract prices to market levels.<sup>55</sup>

48. ENERGY SECURITY, *supra* note 32, at 25.

49. See AM. GAS ASS'N, 1987 GAS FACTS 109 (1987).

50. A. TUSSING & C. BARLOW, *supra* note 41, at 228-29.

51. These terms are defined in the NGPA. "Old gas" is defined in 15 U.S.C. § 3314 (1982) (gas dedicated to interstate commerce before NGPA) and 15 U.S.C. § 3316 (1982) (rollover contracts). "New gas" is defined in 15 U.S.C. §§ 3312, 3313, 3318, 3319 (1982). "High-cost gas" is defined in 15 U.S.C. § 3317 (1982), which also deals with "deep gas." Deep gas is gas from wells producing from more than 15,000 feet. See WELLHEAD PURCHASES, *supra* note 31, at 13-24.

52. WELLHEAD PURCHASES, *supra* note 31, at 16.

53. *Id.* at 28-32.

54. Take-or-pay contract obligations reached \$10 billion for the natural gas industry by the end of 1986. Wald, *Gas Producers See an End to Disputes with Pipelines*, N.Y. Times, Nov. 7, 1988, at D1, col. 1. See also STUDY OF CONTRACTS, *supra* note 44, at 43.

55. Wellhead prices for natural gas under long-term contract were renegotiated under special renegotiation clauses. See ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY, AN ANALYSIS OF NATURAL GAS CONTRACTS, VOLUME III: CONTRACT PROVISIONS COVERING PRODUCTION OF NEW GAS 7-11 (1987) [hereinafter ANALYSIS OF CONTRACTS]. As a basis for pricing of 1984

A large number of contract disputes led to litigation as pipelines sought to reduce take-or-pay obligations.<sup>56</sup> Pipelines holding contracts with "market-out" clauses exercised their option to curtail supplies priced above market levels.<sup>57</sup>

Further regulatory changes, aimed at enhancing market efficiency in response to the chaotic pricing and contract situation, have also occurred. On the customer side, FERC sought to curtail recovery of take-or-pay costs through minimum bills for customers, as a means of making pipelines more responsive to purchased gas costs.<sup>58</sup> On the supplier side, FERC acted to implement common carrier regulations and alleviate take-or-pay obligations.<sup>59</sup> Under these new rules, interstate pipelines offering contract carriage must act as common carriers.

Adequate supplies of natural gas have resulted from rising gas prices in the 1980s.<sup>60</sup> The higher contract prices have reduced gas purchases, leading to a smaller demand base, excess pipeline capacity, and further wholesale and retail price increases.<sup>61</sup> The combination of excess supplies of gas at the field and excess pipeline capacity has opened the way for increased spot market allocation of gas. Also, the contractual problems faced by pipelines create incentives for pipelines to decrease their role as wholesalers and to increase their role as transporters of gas. The share of transport relative to sales can be expected to rise still further as FERC continues to implement common carrier regulations.<sup>62</sup> The

production from post-NGPA wells in July 1985, renegotiation occurred for 21.4% of new gas whose price was decontrolled before January 1, 1985 and for 18.7% of gas whose price was decontrolled after January 1, 1985.

56. For a discussion of the exercise of pricing mechanisms and contract terms, see *id.* at 52 ("Market-out and force majeure actions account for the pricing mechanism for 37 percent of all new gas in 1985.").

57. *Id.* at 10-11.

58. Elimination of Variable Costs from Certain Natural Gas Pipeline Minimum Commodity Bill Provisions, FERC Order No. 380, 49 Fed. Reg. 22,778 (1984), prohibited recovery of take-or-pay payments through minimum bills. For an extensive analysis of minimum bill provisions, see *STUDY OF CONTRACTS*, *supra* note 44, at 21-36.

59. FERC Order No. 436, *supra* note 27, allowed pipelines to pass on the costs of buying out of take-or-pay provisions. Also, certification was eased for pipelines acting as common carriers. Block pricing replaced average or rolled-in pricing. Regulation of Natural Gas Pipelines after Partial Wellhead Decontrol, FERC Order No. 500, 52 Fed. Reg. 30,334 (1987) (to be codified at 18 C.F.R. §§ 2, 284) [hereinafter FERC Order No. 500] amended certain provisions of FERC Order No. 436.

60. "Excess deliverability in 1985 was estimated at about 2 to 3 trillion cubic feet." *ANALYSIS OF CONTRACTS*, *supra* note 55, at 4. See also ENERGY INFORMATION ADMIN., U.S. DEP'T OF ENERGY, ANNUAL ENERGY OUTLOOK 1985 36 (1986).

61. See WELLHEAD PURCHASES, *supra* note 31, at 35.

62. *Id.* at 39-42.

dramatic replacement of sales by contract carriage shifts the focus of interstate pipeline firms away from the provision of wholesale services toward the supply of transportation services. The deregulation of field prices of natural gas and the easing of certification requirements for pipelines has created opportunities for competitive entry and bypass. An evaluation of competition and regulatory policy must begin with a comparison of the relative costs and regulatory constraints that incumbent firms and potential entrants face.

### II. Bypass and Competition

It is misleading to portray competitive entry into regulated markets using textbook models of competitive or perfectly contestable markets. The entrant faces two significant entry barriers not present in either of these models: the sunk costs required for entry and regulatory restrictions. The incumbent also faces regulatory constraints that rarely have been addressed in the economics and legal literatures. To emphasize the importance of these constraints on established firms, we refer to them as *incumbent burdens*. An accurate picture of competition in partially deregulated markets requires a careful assessment of both entry barriers and incumbent burdens.

#### A. Entry Barriers

The literature on regulation and industrial organization has focused attention on the consequences of barriers to the entry of new firms.<sup>63</sup> George Stigler defines barriers to entry as costs incurred by entrants but not borne by incumbent firms.<sup>64</sup> The principal entry barrier results from the need to make market-specific, irreversible investments in capacity upon entry. The incumbent, having already made such investments, is said to have a cost advantage over the entrant; the incumbent's future decisions depend on expected revenues and operating costs and need not reflect sunk costs.<sup>65</sup> This is not necessarily the case in

63. See J. BAIN, *Barriers to New Competition* (1956); D. SPULBER, *supra* note 6; G. STIGLER, *The Organization of Industry* (1968); von Weizsäcker, *A Welfare Analysis of Barriers to Entry*, 11 *BELL J. ECON.* 379 (1980).

64. G. STIGLER, *supra* note 63, at 216-29.

65. W. BAUMOL, J. PANZAR & R. WILLIG, *Contestable Markets and the Theory of Industry Structure* 279-303 (1982).

regulated markets where cost recovery is built into the regulatory process. Entering firms, not yet having incurred construction or set-up costs, must base their entry decision on their ability to recover both construction and operating costs. The incumbent's advantage in a competitive market stems from the possession of available capacity and from an ability to set prices based solely on operating expenses. A firm will undertake the risk of entry only if expected prices cover both capital expenditures and operating expenses. The other principal entry barrier stems from entry regulations rather than technology. Utility regulations impose certification requirements on new entrants.<sup>66</sup> Meeting specific federal and state criteria can raise the costs of entry.

Long-term contracts can address the problem of cost recovery in both competitive and regulated markets. The risks associated with irreversible investment can be shared with customers if an entrant can secure long-term contracts before constructing new facilities.<sup>67</sup> The gas industry has traditionally used twenty-year contracts between suppliers and pipelines and between pipelines and their customers.<sup>68</sup> Established firms, both interstate pipelines and LDCs, have the advantage of extensive transmission facilities. Although long-term contracts alleviate sunk cost entry barriers, another barrier can be created by regulatory requirements that entrants obtain service contracts covering 100% of capacity costs.<sup>69</sup> These reporting restrictions have been relaxed significantly under FERC Order No. 500.<sup>70</sup> A pipeline entering without contractual assurances or, as was generally the case, letters of intent, faces greater risk but bears lower costs of complying with entry regulations.

Economic policy analysts have advocated regulatory efforts directed at removing barriers to entry.<sup>71</sup> Regulatory actions have increased access to facilities in industries with large sunk costs by imposing common carrier obligations and regulating rates. In natural gas, these regulations require contract carriage on existing

66. Certification requirements are discussed in P. MACAVOY, *supra* note 22, at 123.

67. The capital construction costs of new interstate pipelines can reach into the hundreds of millions of dollars. *See infra* Part IV.

68. WELLHEAD PURCHASES, *supra* note 31, at 1.

69. STUDY OF CONTRACTS, *supra* note 44, at 3-5, 40-43.

70. FERC Order No. 500, *supra* note 59.

71. *See, e.g.,* P. JOSKOW & R. SCHMALENSEE, *supra* note 2, at 199-221; Bailey & Baumol, *Deregulation and the Theory of Contestable Markets*, 1 YALE J. ON REG. 111 (1984).

pipelines.<sup>72</sup> Similar phenomena exist in electricity (wheeling),<sup>73</sup> railroads (trackage rights),<sup>74</sup> and telecommunications (equal access).<sup>75</sup> Regulatory authorities and intervenors who seek to assure competitive access to established production and transmission capacity have characterized these facilities as "bottlenecks" or "essential facilities."<sup>76</sup>

In natural gas markets, such efforts at reducing entry barriers can be expected to increase competition in wholesale markets for gas while causing interstate pipelines to act primarily as transportation companies rather than as wholesalers. The natural gas industry has experienced growth in spot market trading and witnessed the entry of independent brokerage.<sup>77</sup> As the transmission segment of the industry becomes more competitive, it is important to assess the consequences for LDCs. In most cases, LDCs are separate entities devoted to distributing and marketing gas.<sup>78</sup> The issue is whether LDCs can compete effectively with interstate pipelines for large industrial customers. An LDC's ability to compete depends in large part on the extent of regulations that create incumbent burdens.

72. See WELLHEAD PURCHASES, *supra* note 31, at 40-41.

73. Wheeling involves the provision of transmission services in the wholesale electricity industry. See Fels & Heaps, *Compulsory Wheeling of Electric Power to Industrial Consumers*, 52 FORDHAM L. REV. 219, 220 (1983); Norton & Early, *Limitations on the Obligation to Provide Access to Electric Transmission and Distribution Lines*, 5 ENERGY L.J. 47 (1984); Pace, *Wheeling and the Obligation to Serve*, 8 ENERGY L.J. 265 (1987); Pace & London, *Introducing Competition into the Electric Utility Industry: An Economic Appraisal*, 3 ENERGY L.J. 1, 14-16 (1982). See generally P. JOSKOW & R. SCHMALENSEE, *supra* note 2.

74. Trackage rights refers to the granting of access to the track owned by a "host" railroad to the trains of another railroad. See Tye, *Post-Merger Denials of Competitive Access and Trackage Rights in the Rail Industry*, 53 TRANSP. PRAC. J. 413, 427 (1986).

75. See MacAvoy & Robinson, *Losing by Judicial Policymaking: The First Year of the AT&T Divestiture*, 2 YALE J. ON REG. 225, 258 (1985).

76. On bottlenecks and the essential facility doctrine, see Tye, *Competitive Access: A Comparative Industry Approach to the Essential Facility Doctrine*, 8 ENERGY L.J. 337 (1987); Note, *Unclogging the Bottleneck: A New Essential Facility Doctrine*, 83 COLUM. L. REV. 441 (1983).

77. A. TUSSING & C. BARLOW, *supra* note 41, at 183-84.

78. See Pierce, *Reconsidering the Roles of Regulation and Competition in the Natural Gas Industry*, 97 HARV. L. REV. 345, 348 (1983); Note, *Freeing the Captives: Nondiscriminatory Access to Transportation in the Interstate Natural Gas Market*, 47 U. PITT. L. REV. 843 (1986).

## B. Incumbent Burdens

### 1. Rate Regulation

The incumbent firm facing entry as the result of partial deregulation is constrained in its price responses to competition. In many instances, because the incumbent confronts pricing restrictions that are not placed on a potential entrant,<sup>79</sup> rate regulation can be an incumbent burden. This difference in restrictions may be due to jurisdictional conflict between regulatory authorities.<sup>80</sup> Uneven application of price regulations may also result from regulators' attempts to "level the playing field" by counteracting perceived entry barriers.<sup>81</sup>

If the incumbent utility is unable to offer competitive prices to potential bypassers, the market outcome will not necessarily promote efficiency. The rates chosen by the regulated firm reflect regulatory restrictions rather than true costs. Thus, entry deterrence (or accommodation) need not indicate that the incumbent (or entrant) possesses superior technology or cost efficiency. Rather, the competitive outcomes reflect the extent to which incumbent burdens are relatively more or less restrictive than entry barriers. In addition to limiting rate charges, rate regulation also allocates costs across customer classes.<sup>82</sup> In practice, costs must be allocated between captive customers, who are generally residential or commercial, and switching customers.

Regulators set rates to allow recovery of operating costs plus a reasonable rate of return on capital or rate base.<sup>83</sup> Therefore, sunk costs, not avoidable or incremental costs, determine prices. The cost recovery feature of rate regulation fundamentally distorts

79. D. SPULBER, *supra* note 6, at 617-24.

80. LDCs in natural gas are subject to state regulation while interstate pipelines are subject to FERC regulation. *See supra* notes 42 and 43.

81. FERC imposed rates under FERC Order No. 500, *supra* note 59, that were designed "to allow a 'level playing field' among pipeline competitors," *WELLHEAD PURCHASES*, *supra* note 31, at 41. In telecommunications, Judge Stephen G. Breyer points out that the FCC has handicapped AT&T by (1) maintaining higher access charges on AT&T for local service; (2) keeping a "price umbrella" over AT&T's competitors; and (3) imposing additional administrative requirements on AT&T for tariff filings. Breyer, *Antitrust, Deregulation, and the Newly Liberated Marketplace*, 75 CALIF. L. REV. 1005, 1022-24 (1987). *See also* MacAvoy & Robinson, *supra* note 75, at 258.

82. D. SPULBER, *supra* note 6, at 200-32.

83. *See* I. A. KAHN, *THE ECONOMICS OF REGULATION: PRINCIPLES AND INSTITUTIONS* 45-51, 113-14 (1971). Operating costs include variable costs, taxes, and depreciation. The rate base consists of total capital expenditures less accumulated depreciation.



pricing decisions. More important, the behavior of regulated firms is not comparable to that of competitive firms that price by equating marginal revenues and marginal costs. The regulated firm cannot reduce prices to the level of operating costs since it must recover rate base expenditures. Valuation of the rate base using historical costs, rather than replacement costs, increases the distortion.<sup>84</sup> Given various depreciation rules, the book value of capital for the regulated firm may exceed its economic value, thus further increasing the mark-up above the operating cost needed for cost recovery.<sup>85</sup>

Another important restriction on price competition arises when the rate structure is based on cost allocation rules. The cost allocation between captive and switching customers is not at issue. The problem is the restriction on the incumbent firm's ability to price competitively to those customers seeking to bypass. Selective entry can occur if the rate structure is not sustainable, leading to higher industry costs if capacity is duplicated.

The existence of subsidies across customer classes creates incentives for bypass.<sup>86</sup> A rate structure involves cross-subsidies if the revenues from any specific service or customer class exceed the stand-alone costs of providing these services.<sup>87</sup> Cross-subsidies

84. See P. MACAVOY, *supra* note 22, at 123-26.

85. *Id.* at 124-25.

86. A monopoly offering a rate structure with cross-subsidies is not sustainable against new entry. See W. BAUMOL, J. PANZAR & R. WILLIG, *supra* note 65, at 202-03.

87. The identification of cross-subsidies has a long history. Cross-subsidies exist when revenues from a service fail to cover its incremental cost, where the incremental cost of a particular service equals the total cost of a group of services net of the stand-alone cost of that service. Baumol traces the history of the "incremental cost test" for cross-subsidies back to Hadley. W. BAUMOL, *SUPERFAIRNESS* 113-15 (1986). Baumol cites W. ACWORTH, *THE RAILWAYS AND THE TRADERS* (1891); E. ALEXANDER, *RAILWAY PRACTICE* (1887); A. HADLEY, *RAILROAD TRANSPORTATION* (1886).

An equivalent test for the absence of cross-subsidies, when total revenues equal total costs, is to require the revenues from each service not to exceed their stand-alone cost. See Faulhaber, *Cross Subsidization: Pricing in Public Enterprise*, 65 *AM. ECON. REV.* 966, 971 (1975). The requirement that revenues cover costs is certainly a basic principle. The requirement that revenues not exceed stand-alone costs recognizes that cost savings may be obtained by joint production so that it is sufficient for revenues to cover incremental costs. Let  $R^1$  and  $R^2$  be the revenues from services 1 and 2. Let  $C$  represent the total costs of providing the services jointly, and let  $C^1$  and  $C^2$  represent the stand-alone costs of the two services. Rate regulation requires that the firm break even,  $R^1 + R^2 = C$ . The stand-alone cost test finds an absence of cross-subsidies if:

$$R^1 \leq C^1, R^2 \leq C^2.$$

Given the zero-profit condition, this is equivalent to the incremental cost test:

may result from regulatory policies designed to provide income transfers across customer classes. For example, such subsidies may run from industrial to small commercial customers. Cross-subsidies can also result from second-best Pareto-optimal pricing, also known as Ramsey pricing.<sup>88</sup> Selective entry can occur if the rate structure is not sustainable, leading to higher industry costs if capacity is duplicated.

Even if the incumbent firm is partially deregulated and allowed to price competitively to a segment of the market, the portion of costs that can be recovered in the regulated segment of its market will continue to restrict its pricing decisions. Joint costs may not be easily attributable, although in industries such as natural gas, transmission costs are a small share of total costs.<sup>89</sup> The partially regulated firm may also have an incentive to shift costs to the regulated market segment, where cost recovery is assured.

## 2. Vertical Rate Structure

A significant feature of partial deregulation concerns regulated pricing of access to a transmission network.<sup>90</sup> The effect of contract carriage in natural gas, wheeling in electricity, or trackage rights for railroads is to unbundle transmission from the set of services provided by the incumbent firm. Distortions in transmission access prices can lead to inefficient purchasing decisions that can have long-run consequences for industry structure.

In the natural gas industry, regulators are attempting to separate the transportation function of pipelines from the marketing function of the downstream affiliates.<sup>91</sup> The pipelines are becoming common carriers under FERC Orders No. 436 and

$$R^2 \geq C - C^1, R^1 \geq C - C^2,$$

where  $C - C^1$  is the incremental cost of good 2 and  $C - C^2$  is the incremental cost of good 1.

88. See *infra* note 118. The pursuit of optimal pricing is addressed in Part III, *infra*.

89. Based on an analysis of 25 interstate pipeline companies, the Energy Information Administration estimates that transmission costs account for less than 14% of total costs. See FERC ANALYSIS, *supra* note 12, at C-2 to C-3.

90. Competition and pricing of access to a network are examined by Panzar, *Sustainability, Efficiency, and Vertical Integration*, in *REGULATED INDUSTRIES AND PUBLIC ENTERPRISE: EUROPEAN AND UNITED STATES PERSPECTIVES* 171 (B. Mitchell & P. Kleindorfer eds. 1979) [hereinafter *REGULATED INDUSTRIES*]; Willig, *The Theory of Network Access Pricing*, in *ISSUES IN PUBLIC UTILITY REGULATION* 109 (H. Trebing ed. 1979).

91. See Note, *supra* note 78, at 856.

500, having already had their upstream role as wholesale purchasers of gas diminished.<sup>92</sup> An important issue facing this industry is whether fully separating the pipeline from its marketing function is also efficient. Although it is evident that pipelines face competition in marketing natural gas, there may be economies from participation in both marketing and transportation of gas. These economies, referred to as *economies of sequence*,<sup>93</sup> yield cost savings from vertical integration. Therefore, the regulated prices of unbundled transport service must be carefully chosen. If the price of transport is set too high, there will be incentives for the construction of duplicative transmission facilities that bypass the existing pipeline. If the regulated price of transportation is too low and cost recovery relies on retail prices, customers will have an incentive to bypass the pipeline's marketing affiliate. Customers will rely on independent brokers or marketers to transport gas over the pipeline. The loss of retail revenues and the increased volume of gas under contract carriage would create financial difficulties for the pipeline unless it readjusts its transport charges.<sup>94</sup>

### 3. *Obligation to Serve and Service Quality*

The incumbent utility may be saddled with regulations that impose an obligation to serve or mandate a certain level of service quality.<sup>95</sup> To the extent that entrants escape such regulations, the obligation to serve acts as an incumbent burden. Moreover, potential bypassers can have all the benefits of new entry without losing the backup facilities of established capacity.

The common carrier obligation of regulated incumbents requires additional investment in production or transmission capacity. Coupled with the cost recovery and cost allocation provisions of rate regulation, this obligation can further bias pricing decisions of the incumbent and raise prices further above incremental costs. Competitive firms can adjust both prices and

92. See *id.*; Lambert, *Bypass in the Natural Gas Industry: The Fruit of Regulatory Change*, PUB. UTIL. FORT., Apr. 3, 1986, at 11.

93. The term is introduced in D. SPULBER, *supra* note 6, at 113. Economies of sequence refer to the cost savings achieved by combining stages in a production sequence.

94. Even more complicated issues arise in connection with the vertical integration of generation, transmission, and distribution in the electric power industry.

95. On common carrier obligations in natural gas, see A. KAHN, *supra* note 83, at 5-7, 156-58.

capacity; an incumbent faced with common carrier obligations is ultimately restricted in its ability to price competitively.

The common carrier obligation confers an additional advantage on the entrant. The bypassing customer gains costless insurance from the incumbent's facilities that provide backup service to the entrant's service. These backup services are available on a stand-by basis at little or no charge.<sup>96</sup> Thus, service quality improvements result from the combination of new entry with the incumbent's existing facilities. The bypassing customer's willingness to pay for new capacity reflects the total value of capacity since the full resource costs are not incurred. Under obligation-to-serve regulations and curtailment priorities, a bypassing customer can be assured of receiving supplies from the incumbent pipeline even during a shortage.<sup>97</sup> This could have unintended consequences.

If the pipeline had reduced its purchases and well contracting strategy because of the load loss of the partial requirements customers, it would seem ironic that the partial requirements customer could become the prodigal son and return to preempt the captive customers because of a difference in its end-use mix (i.e., higher priority users under curtailment rules).<sup>98</sup>

The service quality restrictions faced by an incumbent can also act as an incumbent burden. The incumbent may be required to offer firm service<sup>99</sup> for residential customers and interruptible service<sup>100</sup> for industrial customers. Thus, an entering pipeline may have a competitive advantage by being able to offer firm service to industrial customers. In this regard, note that an incumbent

96. This is due to the fact that the incumbent's pipeline facilities are an irreversible investment. Therefore, due to common carrier regulations, these facilities remain available to all customers of the incumbent. For additional discussion, see *STUDY OF CONTRACTS*, *supra* note 44, at 27.

97. *Id.* at 30, 55-57.

98. *Id.* at 57. Load loss refers to reduced purchases by customers. End-use mix refers to the customer's uses for gas. Curtailment rules are regulations that spell out priorities for the restriction of supplies to particular classes of customers in the event of temporary observed shortages of natural gas.

99. Firm service refers to contracts that do not allow for interruptions in service except perhaps in emergencies.

100. Interruptible service refers to contracts that explicitly allow for interruptions in or curtailment of service under specified conditions in which shortages arise.

firm's investment decisions are subject to regulatory approval.<sup>101</sup> Prudency reviews may restrict capacity expansion to improve the incumbent's service while certification of entrants may involve other criteria administered by a different agency.

### 4. *Long-Term Contracts*

The regulated incumbent may be at a substantial disadvantage in its ability to enter into long-term contracts with its customers. Contractual agreements may be subject to revision or abrogation by the state regulatory commission.<sup>102</sup> An entrant subject to federal regulation may have greater latitude in making contractual commitments.<sup>103</sup> For this reason, contractual restrictions can act as an incumbent burden.

The availability of assured supplies may be of value to industrial customers. The ability of entrants to offer long-term contracts can create incentives for bypass. As noted above, contracts also play a role in mitigating investment risks. Thus, entrants' ability to enter into long-term contracts reduces the potential barriers associated with the cost of new facilities. Given the increasing importance of spot prices for gas and the role of pipelines as transporters, contracts may not play an important role in the near future. However, the inability of incumbent firms to offer long-term contracts may be a factor causing customers to seek access to spot markets for gas.

### 5. *Conflicts among Regulators*

Bypass often can result in conflicts among regulators. Incumbent firms generally are subject to state regulation while bypassers are often subject only to federal regulation. For example, in natural gas markets, state commissions regulate the LDCs<sup>104</sup> while FERC regulates interstate pipelines offering bypass services.<sup>105</sup>

101. Regulatory approval is required to obtain a certificate. *See* 15 U.S.C. § 717f (1982).

102. Most jurisdictions require that utility contracts expressly be made subject to future commission modification. *See, e.g.*, Cal. Pub. Utils. Comm'n, Rules Governing the Filing and Posting of Schedules of Rates, Rules and Contracts, General Order 96-A, §§ IX and X (Jan. 2, 1962) (on file with authors).

103. This is due to the efforts of FERC to promote competition. *See* Hesse, *A New Era in Energy Regulation*, PUB. UTIL. FORT., Mar. 16, 1989, at 19.

104. *See, e.g.*, CAL. PUB. UTIL. CODE §§ 216(a), 222, 701 (West 1965 & Supp. 1989).

105. 15 U.S.C. § 717(b) (1982).

Some economists have argued that competitive entry is a mechanism for changing regulatory policy.<sup>106</sup> They view federal regulation as a means both of increasing market competition and of forcing state commissions to remove restrictions on incumbent firms. Indeed, Broadman and Kalt have asserted that competition between regulators can create economic benefits.<sup>107</sup> This is, in our view, neither good economics nor desirable regulatory policy. Competition between firms subject to different regulatory restrictions cannot be expected to yield the same level of economic efficiency as would competitive markets with free entry. In competitive markets, the success of firms is related to cost efficiencies, competitive pricing and marketing, and product quality. The success of firms in a regulated industry may simply reflect the pattern of entry barriers and incumbent burdens established by regulators. The winners need not be the best competitors; they may be those firms favored by unequal regulatory benefits.

Competition between regulatory authorities is also undesirable. Certainly, one cannot compare an industry regulated by competing regulatory agencies with Adam Smith's description of a competitive market. Conflicting regulatory jurisdictions do not correspond to the "invisible hand" of competition under which consumers and firms pursue economic objectives. The consequences of competing regulations can include increased regulatory intervention in markets, greater administrative costs, and unnecessary delays in certification of new entrants. Variation across jurisdictions can lead to uncertainty about which rules are applicable in specific markets and can increase risk and compliance costs for regulated firms. Hybrid forms of competition involving administrative agencies can only create market uncertainty. Economic efficiency arises from competition between firms that are able to make unrestricted business decisions.

The relative levels of entry barriers and incumbent burdens determine the extent of competitive entry and the resulting industry structure. It is important to observe that the market provides a mechanism through which firms can overcome entry barriers and incumbent burdens. Incumbents and potential entrants can form contractual agreements that compensate for cost differences. Joint ventures allow incremental industry capacity

106. Broadman & Kalt, *supra* note 2, at 204-06.

107. *Id.*

to reflect anticipated future demand while avoiding unwanted duplication of facilities in both production and transmission. Also, joint ventures allow the industry to develop rate structures and customer contract terms that are adjusted to the needs and demand elasticities of various customer classes. A joint venture can have greater flexibility in choosing prices, products, and sources of input supplies, particularly if the incumbent and entrant face different regulatory constraints. Therefore, it is to be expected that in the presence of entry barriers and incumbent burdens, joint ventures will be created for the purposes of marketing and capacity expansion.

### III. Benefits and Costs of Bypass

Competition among firms is the driving force behind the allocative efficiency of market economies.<sup>108</sup> Competition creates efficient prices, product quality and variety, and technical innovation. Under the right market conditions, price and entry deregulation in regulated utility industries can achieve the benefits of competition. However, if only partial deregulation occurs, the remaining restrictions on the behavior of entrants and incumbents can lead to market outcomes that are less efficient than those in a fully regulated regime.

#### A. *Competition and Efficiency*

Partial deregulation can lead to more administrative intervention in markets. As regulators seek to manage competition or to level the playing field, regulatory activities can increase. To counter perceived entry barriers, incumbent burdens are imposed, limiting the established firms' ability to compete. Disguised subsidies to entry may be provided.<sup>109</sup> To the extent that regulatory activities persist after entry controls are lifted, it is impossible to make predictions about the market outcome using models of competitive markets. Managed competition can lead to distorted prices, inefficient product quality, and insufficient or excess investment levels. Therefore, although competition is desirable, that goal need not lead to the conclusion that all entry barriers in the utility industry should be removed. A case-by-case review

108. G. STIGLER, *THE THEORY OF PRICE* 178-80 (3d ed. 1967).

109. D. SPULBER, *supra* note 6, at 617-24.

of the conditions for competition must be completed before lifting entry restrictions.

Some have argued that partial deregulation is an effective strategy for regulators seeking to learn about new technology and production costs.<sup>110</sup> They contend that partial deregulation can be used to allow selective entry so that information is gained from observation of the resulting market equilibrium. After information about new technology is obtained, new regulations can be imposed to take advantage of the acquired knowledge.<sup>111</sup> Gathering information is certainly an important feature of the regulatory process, and partial deregulation undoubtedly provides a rich source of observations about new technology, firm costs, prices, and contractual agreements. However, it is a very costly source of information. Partial deregulation can be an expensive and irreversible experiment, particularly if entry involves large sunk costs.<sup>112</sup> For this reason, partial deregulation appears to be an unwise policy choice.

What criterion should be used to evaluate changes in regulatory policy? In theory, economists generally favor the criterion of Pareto optimality. An economic allocation is Pareto optimal if there does not exist another allocation that makes some individuals better off without making any individual worse off. This criterion is useful for making an initial selection among all available allocations. If an allocation is Pareto optimal, there do not exist changes in regulatory policies that yield benefits for all. Conversely, if an allocation is not Pareto optimal, there is a reallocation of resources that improves each individual's position.

Some regulatory policy options cannot be evaluated using the Pareto optimality criterion since the beneficiaries of the policy choices may vary from option to option. Then it is appropriate to compare net benefits. It may be desirable to maximize total net benefits if it is feasible for winners financially to compensate losers. Otherwise, policymakers must seek alternative means of comparing the welfare effects of policy decisions.

Changes in regulatory policies create winners and losers. In particular, competitive entry may improve the position of large

110. See, e.g., Knieps & Spiller, *Deregulating by Partial Deregulation: The Case of Telecommunications*, 35 ADMIN. L. REV. 391, 391-92 (1983).

111. Knieps & Spiller find that in the case of FCC deregulation of interstate toll service, "partial deregulation is a temporary strategy" that allows the FCC to learn about new technology such as satellite transmission. *Id.* at 395.

112. See, e.g., the case study presented in Part IV, *infra*.



industrial customers seeking to bypass the regulated utility while creating welfare losses for captive customers who face higher prices after entry. Policymakers inevitably compare gains and losses, weighting them on the basis of various considerations, including the preferences of regulators, the political influence of the winners and losers, and the ability of market participants to communicate with the regulators. If bypass leads to a price increase for captive customers and a price drop for switching customers, the regulator must evaluate the welfare effects in formulating regulatory policy toward entry.

*B. Capacity Expansion and Industry Costs*

The effects of entry on productive capacity and total industry costs are an important aspect of bypass. The main issues are whether costly duplication of existing capacity will occur and whether total costs will rise or fall after entry. Evaluating the desirability of entry is somewhat different from determining an optimal industry structure in the absence of existing capacity. Because investments in capacity are irreversible, a reviewing agency must determine whether potential reductions in operating costs are sufficient to justify the construction costs of new capacity. Bypass simply may involve a shift of customers from one firm to another without any significant expansion in capacity. For example, large industrial customers of natural gas companies or electricity transmission companies that are located on the boundary of service areas may simply connect to a competing transmission system.<sup>113</sup> The consequences may reflect price adjustments, an export of excess capacity from one transmission system to another, or both. If customers are able to connect simultaneously to competing systems, they obtain insurance benefits from the backup facilities.<sup>114</sup> This arrangement can be efficient only if the customer pays for the backup services. Just as sunk costs should not determine private decisionmaking, so regulatory decisions

113. In southern California, oil companies engaged in enhanced oil recovery seek alternative supplies of natural gas from companies both inside and outside southern California. See *infra* Part IV. The possibility of competition between electric utilities to serve large industrial consumers and fringe areas is discussed in P. JOSKOW & R. SCHIMALENSE, *supra* note 2, at 21. They find it to be a relatively unimportant phenomenon except in growing service areas.

114. MacAvoy, *Economic Effects of Bypass: A Case Study in the Natural Gas Industry* 3 (June 7, 1988) (Statement Regarding H.R. 4089, The Natural Gas Transition Act of 1988) (on file with authors).

about entry should not consider past capital outlays. In setting regulatory policy toward entry, the imputed costs of alternative policies should reflect the entrant's and incumbent's future costs, not the incumbent's sunk costs. A firm's costs are divided into fixed installation and subsequent variable operating expenditures. Annual operating expenses include resource costs, such as natural gas purchases, and management costs. For a given time horizon,<sup>115</sup> the present discounted value of variable costs can be calculated given projected operating levels and input factor prices. For example, assume that variable costs are determined on the basis of a constant maintained capacity for each service offered. In addition, assume that the incumbent serves two customer classes with outputs  $q_1$  and  $q_2$ , respectively. Let  $V^A(q_1, q_2)$  represent the incumbent firm's present discounted value of variable costs at outputs  $q_1$  and  $q_2$ . The potential entrant, firm B, wishes to serve customer class 2. The expected present discounted value of the entrant's variable costs is represented by  $V^B(q_2)$ . In addition to variable costs, the entrant must first make an irreversible investment in transmission facilities before it can serve customers in the market. The entrant's construction costs are represented by  $K^B$  and depend upon the projected capacity in the new market, in this case  $q_2$ . The entrant's variable cost function,  $V^B(q_2)$ , and capital construction costs,  $K^B$ , are jointly determined since the transmission technology chosen will affect the firm's operating costs. It is reasonable to assume that present discounted variable costs and capital construction costs reflect efficient, cost-minimizing input combinations for the new entrant.

The proper test for choosing whether the incumbent firm or the entrant should provide the service involves a comparison of these costs with and without bypass. If the bypass is approved, the total costs will then equal the sum of the following three elements: (1) the incumbent's variable costs of serving customer class 1 and any change in variable costs to provide service to other customer classes; (2) the entrant's variable costs of serving customer class 2; and (3) the entrant's capital construction costs. Entry is socially desirable only if the total costs of service after

115. An important issue for consideration is the relevant time horizon over which costs should be measured. The variable cost of the incumbent should not exceed the productive life of the incumbent's capital equipment unless allowances are made for replacement or upgrading of facilities. The relevant time horizon for the new entrant is the shorter of the period of amortization of the entrant's new capital equipment or the length of a typical contract with a customer.

bypass are less than the costs without entry. In this example, the cost of service without entry equals  $V^A(q_1, q_2)$ . If entry takes place and the entrant serves all of customer class 2, post-entry variable costs plus capital costs equal:

$$V^A(q_1, 0) + V^B(q_2) + K^B.$$

Entry is efficient only if:

$$V^A(q_1, 0) + V^B(q_2) + K^B < V^A(q_1, q_2). \quad (1)$$

Stated differently, if the incumbent's cost of serving its remaining customers plus the entrant's variable and capital costs are less than the incumbent's variable cost of service without entry, the bypass is efficient and should be approved.

Now, assume that the entrant and the incumbent incur the same variable costs in serving market 2; that is,  $V^A(0, q_2) = V^B(q_2)$ . If the incumbent has variable costs that exhibit economies of scope, the sum of the stand-alone costs of separately serving each customer class will exceed the total costs of jointly serving all customer classes.<sup>116</sup> Therefore, it will never be worthwhile to permit entry. This statement holds true even if there are no construction costs required of the entrant.

The presence of initial capital cost,  $K^B$ , makes the requirement for efficient entry even more stringent. Assume that the incumbent's costs exhibit economies of scope. The entrant's total stand-alone cost must be sufficiently below the incumbent's incremental costs to compensate for the loss of economies of scope. Stated differently, increased efficiency in operations must be sufficiently great to compensate for the additional capital costs. The cost test in equation (1) can be written as follows:

$$[V^A(q_1, q_2) - V^A(q_1, 0)] - V^B(q_2) > K^B. \quad (2)$$

The term in brackets is the incumbent firm's incremental variable cost of serving customer class 2. It is not enough for the entrant's stand-alone costs to be less than the incumbent's

116. Economies of scope are said to exist if:

$$V^A(q_1, q_2) < V^A(q_1, 0) + V^A(0, q_2).$$

See W. BAUMOL, J. PANZAR & R. WILLIG, *supra* note 65, at 71.

incremental variable costs of serving user group 2 for the bypass to be considered efficient. Thus, the cost test for assessing the efficiency of entry may also be stated as follows: the incumbent's incremental variable costs must exceed the entrant's variable costs by an amount greater than the entrant's construction costs. Otherwise, bypass raises the total costs of service.

In principle, there are three possible responses of a utility to a partial entrant's bypass in a portion of its market: (1) profits will fall; (2) costs will be reduced internally; or (3) the remaining (captive) customers will be forced to bear higher rates for the same quality of service. Although it is true that all of these options are possible, they are by no means equally likely to occur. If total returns diminished as selective entry ate away at a historically profitable market, investor confidence would erode. Shareholders would be forced to bear the costs of bypass as the return on their investment fell. These increased risks to investors would be reflected in higher future capital costs for the utility when it sought to finance new investments, which would adversely affect the financial viability of the utility. Thus, although reducing profits is a possible response to bypass, it would appear to be an unlikely choice on the part of the utility.

Alternatively, the utility may try to reduce costs and maintain profits at their pre-bypass level. This could be done either by increasing efficiency or by reducing service quality. If the incumbent is operating at or close to a loss already, lower service quality would be the likeliest result.<sup>117</sup> If investors are not forced to bear the costs of bypass, and the quality of service is maintained, captive customers will inevitably face higher rates after the bypass. This is due both to the loss of economies of scope and to the necessity of covering joint and common costs previously expected to be recovered in the bypass sector. Thus, revenue requirements for remaining customers would increase. The greater the difference between revenues and stand-alone costs of a service class before entry, the higher the rate increases after entry. In other words, the utility's remaining customers must cover the difference between the revenues formerly received from the bypass customers and the incremental cost of serving those customers.

117. See Joskow, *supra* note 9, at 312-14. Joskow examines instances of regulated utilities operating at a loss.

### C. Prices and Welfare

An assessment of the welfare effects of entry requires a comparison with the rate structure in effect before deregulation. This comparison determines the extent to which deregulation creates winners and losers. A crucial issue is whether the rate structure reflects social policy or whether established rates arise as arbitrary outcomes of the regulatory process. To the extent that the rate structure reflects social policy, entry may render pricing goals unattainable. Conversely, if the rate structure reflects cross-subsidies that policymakers view as undesirable, competition will mitigate these price distortions.

The regulated rate structure may reflect efforts to select efficient prices. Ramsey prices maximize a measure of social welfare subject to a break-even constraint for the regulated firm.<sup>118</sup> The social welfare measure is a weighted sum of consumer net benefits. The weights reflect either regulatory preferences or the outcome of bargaining with customer representatives in rate hearings.<sup>119</sup> The resulting rate structure depends on the relative size of the welfare weights and on the effects of price changes on consumer net benefits. The Ramsey price formula equates the relative markup (price minus marginal cost divided by price) to the reciprocal of demand elasticity times an adjustment factor. The adjustment factor depends on the relative welfare weights and the shadow price on the break-even constraint.<sup>120</sup> Therefore,

118. Ramsey pricing is named for Frank Ramsey, who examined optimal taxation. Ramsey, *A Contribution to the Theory of Taxation*, 37 *ECON. J.* 47 (1927). Boiteux presented the first analysis of second-best pricing in a general framework. Boiteux, *Sur la Gestion des Monopoles Publics Astreints à l'Equilibre Budgetaire*, 24 *ECONOMETRICA* 22 (1956), translated as Boiteux, *On the Management of Public Monopolies Subject to Budgetary Constraints*, 3 *J. ECON. THEORY* 219 (1971). See also D. SPULBER, *supra* note 6, at 131-33; Phillips, *Ramsey Pricing and Sustainability with Interdependent Demands*, in *REGULATED INDUSTRIES*, *supra* note 90, at 187, 188-90; Baumol & Bradford, *Optimal Departures from Marginal Cost Pricing*, 60 *AM. ECON. REV.* 265 (1970). The general definition of efficient prices is based on the Pareto optimality criterion.

119. The welfare weights are applied in practice to the net benefits of customer classes (*i.e.*, residential, commercial, and industrial) and they need not be equal. A particular set of welfare weights is associated with each second-best Pareto-optimal price vector. The welfare weights need not be explicitly chosen by regulators, but their existence may be inferred from rate structure decisions.

120. Suppose that there are two customer classes (*e.g.*, residential and industrial) with demands  $D_1(p_1)$  and  $D_2(p_2)$  respectively. Let  $C(q_1, q_2)$  be the production cost of supplying outputs  $q_1$  and  $q_2$  to the two customer classes. Then, the regulated firm's profits are defined by

$$\pi(p_1, p_2) = p_1 D_1(p_1) + p_2 D_2(p_2) - C(D_1(p_1), D_2(p_2)).$$

the rate structure, given by relative markups across customer classes, reflects the set of welfare weights and demand elasticities. Prices are set such that customer classes with relatively inelastic demand bear a greater share of joint costs. A greater welfare weight placed on residential customers can lower prices to those customers and raise them to commercial and industrial customers.

Regulated rate structures can involve cross-subsidies that provide incentives for entry.<sup>121</sup> If a customer class has relatively inelastic demand or a relatively smaller welfare weight, rates may be set such that its share of costs exceeds the stand-alone costs of serving that customer class. Even with equal welfare weights, sufficiently inelastic demand can cause a customer class to subsidize other customer classes. Alternatively, cross-subsidies can result from regulatory decisions that reflect greater concern with the net benefit to some customer class.

Even uniform Ramsey pricing can involve cross-subsidies. Figure 1 illustrates this possibility. The average cost curve (AC) represents the technology available to both incumbent firms and entrants.  $D^R$  represents residential demand,  $D^I$  represents industrial demand, and  $D^R + D^I$  represents total market demand. At the price  $p$ , the regulated firm serving the entire market breaks even. The average cost price is also the Ramsey price in the one-product case. The output levels  $Q^R$  and  $Q^I$  represent the total sales to the residential and industrial customers respectively at the regulated price  $p$ . The average *stand-alone* cost of providing service  $Q^I$  to the industrial customers is  $AC^I$ . The total revenues

Let  $S_1(p_1)$  and  $S_2(p_2)$  be the customer classes. Then, the welfare measure is defined by:

$$W(p_1, p_2) = S_1(p_1) + \lambda S_2(p_2),$$

where  $\lambda$  is a welfare weight. The price vector  $(p_1^*, p_2^*)$  is a Ramsey-Boiteux price vector if it solves:

$$\max_{p_1, p_2} W(p_1, p_2) \text{ subject to } \pi(p_1, p_2) \geq 0.$$

The first order conditions are  $\pi(p_1^*, p_2^*) = 0$ , and

$$(p_1 - C_1)/p_1 = [(\gamma - 1) / \gamma](1/\eta_1),$$

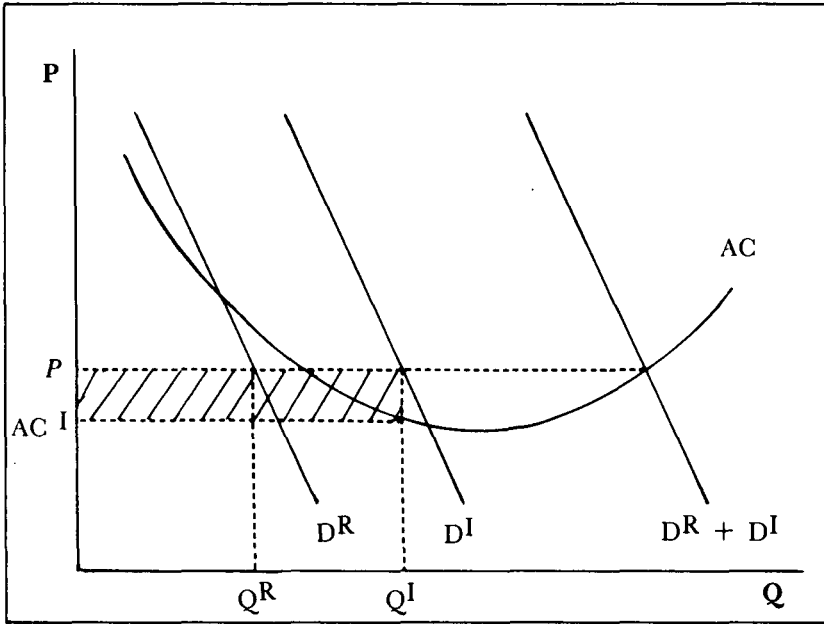
$$(p_2 - C_2)/p_2 = [(\gamma - \lambda) / \gamma](1/\eta_2),$$

where  $\eta_i = -D'_i(p_i)p_i/D_i(p_i)$ ,  $i = 1, 2$  is the elasticity of demand for each customer class.

121. The possibility that Ramsey prices involve cross-subsidies, even with equal welfare weights, is widely noted. See, e.g., D. SPULBER, *supra* note 6, at 131-33.

generated by industrial customers,  $pQ^I$ , exceed the stand-alone costs of serving those customers,  $AC^I Q^I$ , by an amount equal to the shaded area in Figure 1. Therefore, the industrial customers subsidize the purchases of the residential customers who provide revenues below their stand-alone costs.

Figure 1



The existence of cross-subsidies creates opportunities for entry. Opening the market represented in Figure 1 to competition inevitably would result in lower prices to industrial customers and higher prices to residential customers even if the incumbent firm were able to deter entry. Bypass cannot be justified if the existing rate structure yields greater welfare than would the competitive rate structure. If the incumbent firm in Figure 1 were restricted in its ability to respond to competition, new firms would enter to serve the industrial customers. Assume that this bypass were inefficient under the cost test developed above.<sup>122</sup> The total payments by residential and industrial customers of the incumbent would rise to cover these costs, to the extent that regulators permit cost recovery by the incumbent. As a result, the primary effects of bypass on customers remaining on the local utility

122. See *supra* notes 114-17 and accompanying text.

system are rate increases that recapture the lost net revenues formerly provided by those who left. As the remaining customers cut back on natural gas usage in response to a price increase, the joint costs must be covered on sales revenues from a smaller output base. As total output declines, average costs per unit rise, since the total overhead costs remain constant. Therefore, the rate increases borne by the remaining customers must meet the incumbent's revenue requirement.

If the existing rate schedule achieves the goals that regulation is designed to accomplish, entry that changes this schedule will have a negative impact on social welfare. Accounting for these welfare effects requires a test that determines the impact of bypass on an LDC's remaining customers. A monetary measure of the welfare loss attributable to the increase in prices resulting from bypass can be developed by quantifying the change in consumer surplus. Consumer surplus represents the difference between the total value consumers receive from the consumption of a particular good and the total amount that they pay for it.<sup>123</sup> In essence, this calculation seeks to identify the hypothetical change in general purchasing power necessary to make consumers indifferent to bypass.

#### IV. Natural Gas and Bypass: A Case Study

The desirability of entry under partial deregulation in industries such as natural gas can be determined only from a case-by-case review of the facts. In the preceding Parts, we outlined the underpinnings of a framework for evaluating the desirability of particular bypass proposals. In this Part, the framework is applied to the enhanced oil recovery (EOR) market in Kern County, California.<sup>124</sup> To evaluate the desirability of entry in such a case,

123. In practice, the change in consumer surplus can be calculated under certain conditions as the area to the left of the demand curve for natural gas between the pre- and post-bypass prices. See Willig, *Consumer Surplus Without Apology*, 66 AM. ECON. REV. 589, 591-92 (1976).

124. Enhanced Oil Recovery is a steam injection technology used to extract heavy crude oil. In part because of air quality standards, development of EOR operations has been tied to increased use of natural gas as fuel for producing steam in cogeneration projects. The Southern California Gas Company forecasts that the demand for natural gas by EOR customers in Kern County will equal approximately 600 million cubic feet of gas per day (MMCFD) at its peak in 1995.

The data and analysis contained in this section draw from P. MacAvoy, *An Analysis of the Effect of Bypass by Potential Entering Pipelines into California Natural Gas Distribution Markets: Competition Is Not Always Better* (Report submitted as testimony before the



two complementary tests should be used: (1) the cost test described earlier, based on economic efficiency considerations;<sup>125</sup> and (2) a social welfare test that examines the impact on customers remaining after bypass.

A. *The Cost Test in the EOR Market*

In response to the potential for large increases in gas demand by EOR customers in Kern County, two applications were filed with FERC to construct major interstate pipelines to deliver gas for use in the EOR operations.<sup>126</sup> In April 1985, Mojave Pipeline Company requested approval of a \$270 million project designed to deliver 600 million cubic feet of gas per day (MMCFD).<sup>127</sup> In May 1985, Kern River Gas Transmission Company requested approval of a pipeline that would deliver 700 MMCFD at an estimated construction cost of over \$714 million.<sup>128</sup> The local utilities involved, Southern California Gas and Pacific Gas and Electric, responded that they had in place essentially all of the capacity needed to meet demand forecasted for the coming decade.<sup>129</sup>

Federal Energy Regulatory Comm'n in the matter of Mojave Pipeline Co., Docket No. CP85-437, Exhibit SG-3) (on file with authors). The authors assisted Southern California Gas Company in the *Mojave* case. However, the opinions and conclusions reached herein do not necessarily reflect the views of Southern California Gas Company.

125. See *supra* notes 114-17 and accompanying text.

126. P. MacAvoy, *supra* note 124, at 11-13. The applications have been consolidated into a single proceeding. For a general statement of the scope of the proceeding, see Mojave Pipeline Co., 35 Fed. Reg. Energy Comm'n Rep. (CCH) ¶ 61,199 (May 19, 1986) (Docket Nos. CP85-437 et al.) (order consolidating proceeding for comparative hearing).

127. P. MacAvoy, *supra* note 124, at 12. To deliver this amount of gas, the Mojave project requires additional interconnections and looping provided by the El Paso Natural Gas Company (El Paso) and the Transwestern Pipeline Company (Transwestern). "El Paso is proposing to construct an additional 14 miles of pipeline so as to be able to provide 400 MMCFD to Mojave. The cost of this construction is approximately \$11 million. Transwestern is proposing to construct over 357 miles of pipeline which will provide 320 MMCFD to Mojave at a cost of \$200 million." *Id.* at 12-13.

128. *Id.* at 12. For Kern River to provide its designated service to the EOR market, Northwest Pipeline Corporation (Northwest) must build an interconnection with Kern River. The estimated construction cost of this interconnection is over \$1 million. Both Mojave and Kern River submitted variations to their "base case" pipelines. For example, the Mojave options included pipelines that would deliver between 400 to 600 MMCFD; the Kern River alternatives include pipelines with capacities of 400 to 1000 MMCFD.

129. *Id.* at 11. The analysis in this Part is predicated on the existence of sufficient capacity in place. If large investments in capacity are required, estimates of the incumbent's costs will rise. This can reverse the outcome of the cost test and lead to a different recommendation.

Kern River and Mojave proposed to construct separate facilities designed to serve only one customer class.<sup>130</sup> In a study conducted for Southern California Gas Company, estimates were made of the present value of stand-alone costs in 1986 dollars for the entrant pipeline options.<sup>131</sup> The stand-alone costs of the entrants can be compared to the incremental cost of incumbent service, under a scenario of 600 MMCFD.<sup>132</sup> The study shows that the present value cost of incumbent service is approximately \$142 million<sup>133</sup> while that of the Kern River option is estimated to be \$658 million.<sup>134</sup> This amount includes the cost of the pipeline expansion necessary to provide gas to meet the demand in Kern River's application. The present value cost of the Mojave option is approximately \$568 million.<sup>135</sup> In present value terms, the entrants' costs exceed the incumbent firms' cost by a factor of from four to five. These differences amount to \$425 million for the Mojave proposal and \$515 million for the Kern River option.

This analysis indicates that the resource costs of incumbent service to the EOR market are significantly lower than those of the proposed entrant pipelines. Entry by Kern River or Mojave would not be in the interest of economic efficiency because total costs would increase by several orders of magnitude. If for some reason both pipelines were certified and built, the extra cost would exceed \$1 billion.

Witnesses for Mojave and Kern River claim that the cost estimates present only part of the story. They argue that a proper analysis must consider the benefits derived from bypass.<sup>136</sup> However, as indicated earlier, in this case such benefits are to the bypassing customer and thus do not produce economy-wide gains

130. *Id.* at 15.

131. The estimates include capital and operating costs.

132. This is the cost test that was developed *supra* notes 114-17 and accompanying text, and summarized in equation (2), *supra*.

133. P. MacAvoy, *supra* note 124, at 48. These costs represent the variable operating costs that Pacific Gas and Electric Company and the Southern California Gas Company would incur. Because the utilities have estimated that they have the present capacity and facilities to serve this market, additional construction costs are not required. *Id.* at 11. These costs would be adjusted if any additions to capacity were required to meet demand.

134. *Id.* at 48.

135. The estimates assume a contract life of 15 years and a discount rate of 7.5%.

136. Kenneth Heyer, Prepared Direct Testimony 10-11, 27-34 (Mar. 1987) (FERC Docket Nos. CP85-437 et al., Exhibit No. DOJ-KH-1) (testimony on behalf of Antitrust Division, U.S. Dep't of Justice) (on file with authors); Joseph Kalt, Prepared Rebuttal Testimony 2-10, 15-20 (June 1987) (FERC Docket Nos. CP85-437 et al., Exhibit No. MP-69) (testimony on behalf of Mojave Pipeline Co.) (on file with authors).

because they are paid for by other customers. The entrants merely provide the bypassing customer access to a second source of supply that is now to be subsidized by the utilities' remaining customers.<sup>137</sup> This is a significant aspect of the entry process. The bypassing customer pays for the entrant's services but not for the standby service from the LDCs. The standby service is provided at regulated rates. Captive customers of the LDCs face higher rates required to cover the joint system costs due to the loss of service to the bypass customers. This need not always be the case. In some instances the benefits from bypass may exceed the additional costs imposed on captive customers. In the present instance, bypass can provide positive benefits to both switching and captive customers if capacity expansion is needed to meet anticipated demand levels. In that case, certification of entry would be desirable.

The payment of compensation for welfare losses resulting from bypass is a separate issue. It is questionable whether bypassing customers should bear the financial responsibility for the lower demand of the LDC. Moreover, redistributive taxation does not appear to be a proper undertaking for regulatory authorities. It should be noted that joint ventures between an incumbent and an entrant provide a means of sharing the costs of capacity expansion without necessarily shifting all current capacity costs onto existing customers.

#### B. *A Welfare Test in the EOR Market*

If bypass in the EOR market were permitted, our calculations indicate that the remaining customers of the incumbent utility would incur significant welfare losses. For example, it is estimated that residential customers in 1995 would incur a welfare loss of \$18 million and nonresidential customers would incur a welfare loss of \$34 million.<sup>138</sup> Translating future losses into present value

137. Detailed calculations are available from the authors upon request. The calculations employ a discount rate of 7.5%.

138. Welfare losses are measured in terms of the total loss in consumer surplus due to a rise in the prices charged to the incumbent utility's captive customers. A comparison is made between the prices charged by an incumbent that would deter entry in the absence of incumbent burdens and the prices charged in the event of entry. If entry occurs, prices rise for captive customers since the bypassing customers no longer cover a share of capital costs. There are assumed to be no net benefits from entry in the sense that the bypassing customers are charged the same prices in the entry deterrence case and the case with entry. The loss is primarily attributed to the fact that captive customers bear the full costs of

terms, the remaining customers would incur an estimated aggregate welfare loss attributable to bypass of \$421 million over the years 1990 to 2004. There would be negligible compensating gains to final consumers of petroleum products from bypass, since EOR production would not affect petroleum product prices.

The end result of bypass, therefore, is that the bypasser would receive added service from a dedicated pipeline and free back-up access to the utility's system, all at the expense of remaining customers who would be forced to pay higher rates to make up the lost net revenues. If it is indeed true that bypass plus the back-up services of the incumbent pipeline provide a "new service," then those who benefit should be willing to pay for the back-up service as well. Only when such compensation is provided will a demand for "new service" have been validated in economic policy. A case could be made for certifying Mojave or Kern River if they were to provide compensation for reserved capacity to the utilities to prevent rate increases for home consumers in southern California. Under the existing regulatory framework, of course, no such compensation is required.

## Conclusion

The influence of rate regulation on the investment decisions of regulated firms suggests that observed capacity levels depend upon regulatory policies. At the same time, customer demand patterns depend strongly on regulatory decisions. Regulatory actions that create incentives for customer bypass and encourage increased investment in capacity may be inconsistent. The resulting excess capacity may lead to cost inefficiencies that increase costs to consumers and reduce the returns on investment in regulated markets. This possibility is referred to as *uneconomic bypass*.

Existing rate structures and service requirements create incumbent burdens that inhibit the existing firm's ability to compete effectively with an entrant. The ultimate consequence may be uneconomic bypass. Rate structures that result from regulatory pursuit of welfare objectives can create economic incentives for bypass. If revenues generated by a particular class

existing capacity, due to the loss of revenues from bypassing customers that is diverted to pay for new capacity. If existing capacity were not adequate to meet demand at market prices for delivered gas, then entry would generally result in a net welfare gain.

of service exceed the stand-alone cost of a new pipeline, the bypasser is able to profit by providing service to the market segment providing the cross-subsidy. A commonly overlooked feature of most bypass settings is that bypassing customers not only receive the service that they purchase from the entrant, but also obtain back-up service from the existing utility at no substantial cost to them. While the industrial customer would normally use the new entrant's bypassing transmission facilities, in the event of system failure or contract breakdown, the customer could return to the LDC and access its lines. Because state regulation mandates the provision of service, the LDC cannot refuse this request. The availability of this second-source without charge substantially increases the reliability of the bypass service.

Proponents of partial deregulation have recognized the presence of incumbent burdens such as rate regulation and the difficulty in making contractual commitments for regulated incumbents. Broadman and Kalt stress that the pressures created by bypass will force the bypassed LDCs and the state regulatory commission to shed these burdens by opting for redesign of rate structures or by renegotiating long-term contracts.<sup>139</sup> Moreover, they argue that competitive entry might spur the LDC into providing higher service quality and achieving greater cost efficiency.

Both considerations are certainly important in evaluating applications for certification of new entrants. There is general agreement that competition can enhance product quality and cost efficiency. It is also likely that competition will create pressure on LDCs and state regulators to change rate structures and other regulatory policies. However, two issues remain. First, the timetable for changes in state regulatory policy is not easy to establish. If incumbent burdens are removed slowly, there will be incentives for entry that will not reflect the long-run costs and benefits of entry in the absence of regulation. The entrant may establish costly permanent facilities in anticipation of gradual deregulation. Thus, the resulting market equilibrium will not correspond to that observed in an unfettered competitive market. Second, it is not evident that rapid elimination of state regulation is always desirable if the LDC technology exhibits the characteris-

139. See Broadman & Kalt, *supra* note 2, at 196-201. We thank John Yetter of the YALE JOURNAL ON REGULATION for this point.

tics of a natural monopoly and the LDC possesses adequate existing capacity. As we have emphasized, the allocative and efficiency effects of such deregulation require careful consideration.

A federal policy of more open access in an industry where state agencies implement regulation will not reduce the burden of excessive regulations; rather, it invites economic waste. There may be no feasible pricing system that a utility can implement under two sets of agencies. Thus, some entry controls may continue to be necessary for efficient regulated markets. This does not mean that inefficient utilities deserve protection from entry. Rather, it suggests that each bypass application has to be evaluated on a case-by-case basis. The cost test presented here<sup>140</sup> provides a means of examining whether duplication of facilities will result from new entry. A welfare test, such as the one considered in the preceding analysis,<sup>141</sup> can be used to determine the effects of changes in rate structures that occur in response to actual or potential entry. These tests could be included as part of a general framework used to evaluate bypass proposals on a case-by-case basis.

At the same time, it is important to recognize the high administrative and transaction costs involved with evaluating bypass on a case-by-case basis. Regulatory commissions may be inundated with a large number of competing applications of a complex technical nature. The choice among the candidates for certification necessarily reflects the somewhat arbitrary considerations involved in evaluating applications and may also reflect the preferences of and information available to regulators. Additionally, market mechanisms for the allocation of franchises or the right to serve may yield benefits from competition, but they can be costly and difficult to implement.<sup>142</sup> Finally, certification hearings are frequently lengthy and can delay even desirable entry. The transaction costs associated with certification procedures should be weighed against the welfare effects and capital costs associated with bypass of existing facilities. This comparison

140. See *supra* notes 114-17 and accompanying text.

141. See *supra* Part IV.B.

142. For a discussion of difficulties in competitive franchise allocation, see Williamson, *Franchise Bidding for Natural Monopolies—In General and with Respect to CATV*, 7 BELL J. ECON. 73 (1976). See also D. SPULBER, *supra* note 6, at 252-64 (proposing model that corrects difficulties with franchise bidding schemes).

should be carried out in the context of a re-evaluation of federal and state regulatory policy.

In formulating regulatory policy toward entry, it is important to determine whether the market mechanism is allowed to function or whether competition is impeded. If partial deregulation or re-regulation imposes either entry barriers or incumbent burdens, the resulting competitive entry need not yield efficient decisions about prices, product quality, investment, or innovation. Experimenting with competitive entry, while maintaining rate regulation or common carrier obligations, can yield market outcomes that are less efficient than those found under full regulation. Investment decisions and contractual agreements made during the transition to a market with reduced regulation can have significant effects on the future structure of the industry. Entry can provide many benefits, but it can also result in costly excess capacity and in rate structure changes with substantial adverse welfare effects. As deregulation policy continues to evolve for the natural gas industry, as well as for the electricity and telecommunications industries, it is important to remember the potential costs of competitive entry.

